

## REMARKS/ARGUMENTS

In response to the Office Action dated November 2, 2004, Applicant respectfully requests the Office to enter the above amendments and consider the following remarks. By this amendment, Applicant amends claims 1, 4, 6 and 11. No claims have been cancelled or added by this amendment. After entry of this paper, claims 1 and 3-14 remain pending in this application.

### 35 U.S.C. § 103 Rejections

Claims 1 and 3-14 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Vandergrift (U.S. Patent No. 5,775,715) in view of Lazarus (U.S. Patent No. 5,857,694) and/or Hagood (U.S. Patent No. 5,869,189), as previously applied by the Office.

Applicant respectfully submits that the current claim are patentable over the cited references. In sum, additional detail describing the *self powered* features of claims 1 and 3-14 has been added to further clarify the novelty of each of the claimed combinations. Specifically, independent claims 1, 6 and 11 have been amended to clarify how the novel arrangements of *self powered* transducer elements, Y-shaped flex circuits, and storage elements are not disclosed in the cited art. As set forth in more detail below, Vandergrift, Lazarus and Hagood fail to teach or suggest these patentable combinations and *self powered* features.

Independent claims 1, 6 and 11 recite, *inter alia*, a racket having a self-powered piezoelectric damping system, "wherein stored power is supplied back to the transducer elements, and all electrical power supplied to the transducer elements is derived from power extracted from mechanical deformation of the racket; and wherein the transducer elements convert said electrical power to mechanical power, said mechanical power being adapted to actively stiffen said racket." The cited references, either alone or in combination, do not teach or suggest at least this recitation, and thus independent claims 1, 6 and 11 are patentable over Vandergrift, Lazarus and Hagood.

With respect to Vandergrift, the record reflects its failure to disclose a self-powered piezoelectric damping system. See BPAI Opinion, p. 3, lines 8-9. Therefore,

Vandergrift also cannot teach or suggest related aspects such as, *inter alia*, that "all electrical power supplied to the transducer elements is derived from power extracted from mechanical deformation of the racket," as now recited in claims 1, 6 and 11. Accordingly, claims 1, 6 and 11 are patentable over Vandergrift.

With respect to Hagood, the present amendments help clearly distinguish Hagood from the rackets recited in independent claims 1, 6 and 11. Hagood's disclosure is primarily focused on the composites used for structural control, themselves, and behavior of these composites in relation to electric fields. In Hagood, for example, teachings of subject matter like control components are limited to a simplified control unit 22, actuating signals, and respective "field-on" and "field-off" states. See, e.g., column 5, lines 20-59. On the other hand, amended claims 1, 6 and 11 now include recitations drawn to the active implementation of the various control and feedback components. Hagood, then, fails to teach or suggest recitations of the claimed combinations, such as that "stored power is supplied back to the transducer elements," that all such "power [being] supplied [back]... is derived from ... mechanical deformation," or that converted mechanical power is re-applied to "adapted to actively stiffen said racket." Accordingly, claims 1, 6 and 11 are also patentable over Hagood.

With respect to Lazarus, Applicant submits that this reference is also clearly distinguishable from claims 1, 6 and 11, as presently amended. Lazarus discloses only a simple passive embodiment as well as a battery-powered active embodiment. See, e.g., column 9, line 24 – col. 10, line 7, and col. 10, lines 8-67. In contrast, the claimed invention is directed to circuit components and related manipulations of energy that are vastly different in nature. Specifically, then, as set forth below, neither the passive nor active embodiments of Lazarus teach or suggest each and every recitation of independent claims 1, 6 and 11.

Regarding Lazarus' passive embodiment, independent claims 1, 6 and 11 clearly recite an active, not a passive system. The Office has attempted to argue that "the capacitance of the shunt resistor is considered to allow the circuit to inherently store power." In addition to amended claim language of scope rendering this argument moot, Lazarus itself clearly articulates that the disclosed systems dissipate, rather than store, power. Specifically, Lazarus' passive embodiments merely "employ[] a simple shunt

resistance to passively dissipate the strain energy entering the electroactive element" (col. 10, lines 4-6). The current claims, on the other hand, are drawn to combinations having more sophisticated manipulations of energy. For example, claims 1, 6 and 11 recite that "stored power is supplied back to the transducer elements," that the power being "supplied [back] ... is derived from ... mechanical deformation," and that converted mechanical power is re-applied to "adapted to actively stiffen said racket." Therefore, this embodiment of Lazarus is truly passive; it does not include elements arranged to manipulate the salient energy in any additional manner as now clarified in claims 1, 6 and 11. Thus, claims 1, 6 and 11, as amended, clearly define over Lazarus' passive embodiment.

Regarding Lazarus' active embodiment, independent claims 1, 6, and 11 are also clearly distinguishable. Specifically, these claims now recite, *inter alia*, racket components wherein "all electrical power supplied to the transducer elements is derived from power extracted from mechanical deformation of the racket." The active embodiment of Lazarus, however, fails to teach or suggest such features because it requires the use of a separate battery power pack, such as a 9-volt battery. See, e.g., Lazarus, col. 10, lines 18-21. This is a critical disadvantage over the claimed device because it requires an additional element that is costly and has a limited lifespan. According to the clarified elements and features of claims 1, 6 and 11, then, the inclusion of such battery pack prevents Lazarus' active embodiment from rendering these claims unpatentable. Therefore, Applicant submits that claims 1, 6 and 11 are patentable over Lazarus.

Moreover, Applicant respectfully submits that the *combination* of Vandergrift, Hagood and/or Lazarus also fails to overcome the deficiencies noted with respect to each of these references, above. Accordingly, because all recitations of the claimed are not taught or suggested by any combination of systems described in Vandergrift, Hagood, and/or Lazarus, Applicant submits that the instant rejection under 35 U.S.C. § 103(a) fails to satisfy a first criterion necessary to establish a *prima facie* case of obviousness, namely, that the prior art references must teach or suggest each and every element recited in the claims. See M.P.E.P. § 2143.03. Therefore, claims 1, 6 and 11 are patentable over the cited references.

Claims 3-5 depend upon claim 1 and therefore include all elements and recitations thereof. Similarly, claims 7-10 depend upon claim 6 and therefore include all its elements and recitations. Additionally, claims 12-14 depend upon claim 11 and therefore include all its elements and recitations as well. As explained above, claims 1, 6 and 11 are patentable over Vandergrift in view of Lazarus and Hagood. Accordingly, claims 3-5, 7-10 and 12-14 are also patentable for at least the same reasons given above.

Therefore, for at least the reasons stated above, a prima facie case of obviousness has not been established by the instant rejection. Accordingly, Applicant requests that the instant rejection under 35 U.S.C. § 103(a) be withdrawn, and the claims allowed.

As a final matter of simple clarification, the term "first" was added to refer to one of the circuits recited in the claims. This clarification was made for the clerical purpose of more clearly distinguishing this circuit from the Y-shaped flex circuit, and, thus, this change was not made for any purpose relating to patentability.

In view of the foregoing remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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